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Muse makes databases sing

*Occam Research's
easy-to-use data-analysis
tool brings flexible
reporting to users of
corporate databases.*

By Jonathan A. Oski

Muse, a data-analysis tool recently released by Occam Research Corp., seeks to break down many of the barriers to effective data analysis found in the current means of data management and reporting used in large organizations. When properly deployed, it can better delegate the responsibilities for data management and analysis within an organization, potentially eliminating some of the frustration associated with users' insatiable appetite for reports. In this way, Muse can help information-systems organizations free themselves from some of the reporting backlogs that dog even the best-staffed companies.

Part of the fun in exploration is not knowing what you are looking for until you find it. In this respect, Muse can be thought of as the ultimate vehicle for exploring the many caverns of your corporate databases. While spreadsheets and printed reports from a database may suffice for examining 2-D data, understanding the many complex relationships in your database often goes well beyond the capabilities of these conventional tools. Printed

reports present a static description of a dynamic environment. As a data-analysis tool, Muse can help you to poke around your data easily and quickly to spot trends and gain a better understanding of the dynamics that propel (or restrain) your organization.

What is Muse? Muse is not easily categorized but it is best described as a relational database manager with a natural-language interface, combined with a multi-dimensional spreadsheet engine that can produce animated graphics. It can tackle a variety of jobs, but its forte is the ubiquitous one of

data analysis.

Occam provides two versions of Muse for Macs with or without math coprocessors. Muse's recommended system configuration calls for a high-end 68030- or 68040-based Macintosh with 5 Mbytes of memory, a color display, 40 Mbytes of disk space and System 7, although it will run on any Mac with System 6.0.5 or greater, 4 Mbytes of RAM and at least 10 Mbytes of free disk space.

Asking questions. The Muse environment consists of four window types — Script, DataBook, WorkBook and Chart — and a tool palette. The Script window is the place where you can ask questions or inform Muse about new relationships in your data. A common limitation found in products that use a natural-language interface is an inadequate lexicon for parsing com-

ON BALANCE

Muse
Occam Research Corp.



Occam has taken head-on the tedious task of data analysis. Unlike any other tool available for the Mac, Muse combines much of the power of a relational database engine with flexible and easy-to-use data-analysis tools that allow you to see your data in a whole new light. It has a natural-language interface that allows you to ask questions about your data using terminology from extensible dictionaries. It has a few minor wrinkles that need to be ironed out, but overall Muse may be the ideal reporting tool any information systems.

SCORE CARD

Muse

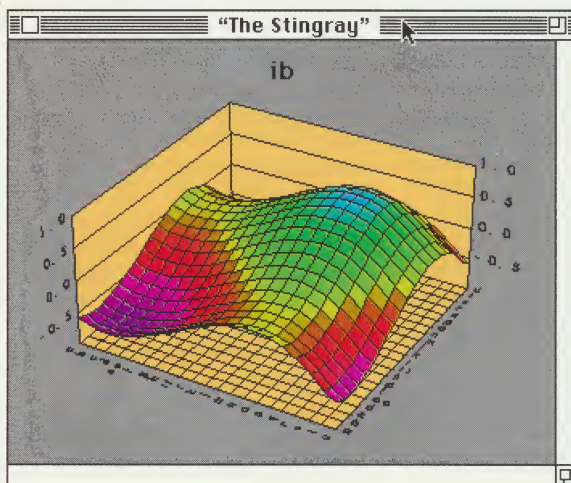


Overall value	○
Performance	○
Features	●
Ease of use	○
Documentation/support	●
List price	\$695

● Excellent ● Very good ○ Good
○ Average ○ Below average

MUSE WorkBook 4						
Juice products delivered and billed.						
All Pages		Apple	All Chapters			
		Juice Sales	Pulp Sales	Quota	Cost of	Cost
United States	1986	\$4,680,007	\$234,000.0	\$4,800,000	\$758,000.0	\$864,000.0
	1987	\$5,240,399	\$261,225.0	\$5,000,000	\$859,000.0	\$956,000.0
	1988	\$6,419,488	\$305,447.0	\$5,500,000	\$953,490.0	\$1,000,000.0
	1989	\$6,259,001	\$314,555.0	\$5,857,500	\$963,024.0	\$1,030,000.0
	1990	\$6,446,771	\$325,665.0	\$6,326,100	\$1,020,806	\$1,070,000.0

Muse's WorkBook closely resembles a spreadsheet. A WorkBook can display up to eight dimensions of data, although only two horizontal and vertical dimensions can be viewed concurrently.



Graphs are created directly from Muse WorkBooks. When you specify more than two dimensions of data to be graphed, Muse creates a 3-D graph such as the contour graph shown here. Like other 3-D charting tools, Muse lets you change the orientation of the graph.

mands and queries. Muse is shipped with a large dictionary that is well-suited for a broad range of applications. Questions or statements entered into the Script window can be evaluated arithmetically or on the basis of information stored in a relational database.

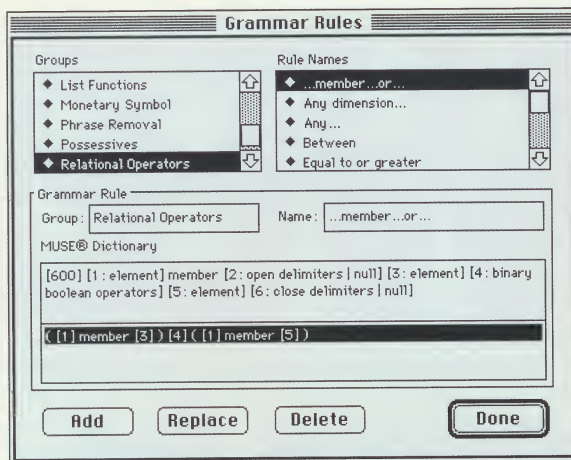
Muse excels at unit translations as well. For example, you can ask Muse to convert inches to microns or dollars to drachmas. It also is "smart" enough to understand relationships between units. For example, if you enter "What is 220 volts/20 amps?" into the Script window, Muse will respond with the correct answer, 11 ohms.

Muse's lexicon can be expanded via the Script window. Changes made to the dictionary can apply to a single database or universally to the Muse application environment. A typical application of this feature may be to add or customize Muse so that it correctly interprets your own terminology. This is one area where the functionality of the product can be extended to enhance its application to a variety of data-analysis opportunities. The contents of the Script window, like other Muse windows, can be saved so queries or other scripts may be re-used.

DataBooks. Occam has cleverly chosen a series of book metaphors to refer to different components of Muse. DataBooks are relational databases that store data available for analysis. The structure of a DataBook can be as simple as a flat file or as complex as a collection of eight-dimensional, third normal form data (data in which columns that do not contribute to the table's key are moved to a different table).

DataBooks present the most challenging construct to the Muse user. As the data stored in DataBooks provides the foundation for much of the analytical features of the product, creating the DataBooks is one of the single most important tasks in using the product. The Muse Reference manual has a discussion on relational theory and the relational database model, but in our view, creating DataBooks is probably best left to someone experienced in relational database structures. In this light, we see Muse as a tool in which the responsibility for optimal use rests with both the information-systems organization and the user. The IS organization should be responsible for laying the groundwork for the user. Once the foundation has been completed, the user can be let loose with Muse to "read" the DataBooks using the query, reporting and analysis tools provided with Muse.

Muse supports four major data



In addition to the dictionary, Muse allows you to specify rules regarding how the Muse parser deciphers the statements issued in the Script window. Like Muse's dictionaries, the Grammar rules can be tailored to suit the needs of your business.

types — text, Boolean, number and date, and time. The number data type includes provisions for integer, real, rational, ordinal and percentages. Indexes are created by categorizing data during the initial loading process. The establishment of indexes, or keys, enables more-efficient retrieval of data from the DataBook. Muse uses standard relational indexing structures as dimensions, which are the primary keys; categories, which are the secondary keys; and links, which are foreign keys.

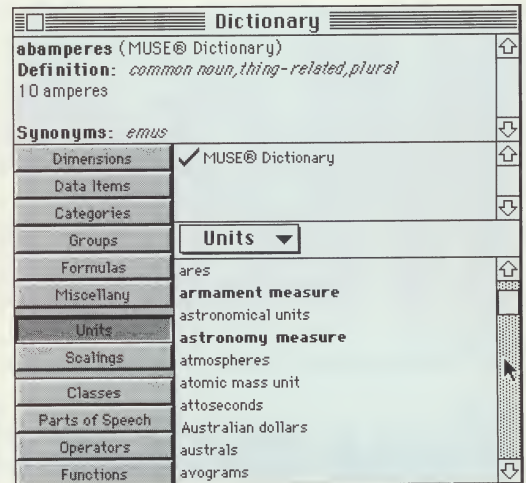
Loading data. Once your data has been extracted and normalized you can load it into an existing DataBook or use it to create a new DataBook. DataBooks can be loaded from Lotus Development Corp.'s 1-2-3 WKS or WK1 files; Ashton-Tate Corp.'s dBASE III DBF; Microsoft Corp.'s SYLK; comma-, space- or tab-delimited text; or fixed field-length files. Muse also supports Fairfield Software Inc.'s ClearAccess, which allows you to retrieve data from an SQL database server for importation into DataBooks. Finally, data can be loaded from WorkBooks, another variation of the book metaphor found in Muse. WorkBooks, which are composed of rows and columns similar to a spreadsheet, also can be filled with imported data.

Muse allows you to secure the data stored in DataBooks by assigning a single password or individual passwords to the file. The creator of the DataBook subsequently owns the object and is responsible for granting or revoking privileges to the data. This feature lets you store sensitive information in a collection of DataBooks whose audience may be widespread.

Getting to work. The bulk of data analysis performed with Muse

centers around the WorkBook, a multidimensional matrix of rows and columns designed to let you rummage around your data. WorkBooks can be populated with data directly from a DataBook or a file or from data that you input manually. Like Brio Technologies Inc.'s DataPivot (see MacWEEK, Feb. 17), you can easily transpose row-and-column-oriented information to gain additional perspective on your data. Muse WorkBooks allow you to concurrently view up to two horizontal and vertical dimensions. Additional dimensions (up to eight) are treated as pages and chapters to which you can easily navigate using a mouse.

Muse lets you derive new information using formulas and queries. These formulas can be entered using Muse's natural language, which makes the process both intuitive and easily documented. Data visible in your WorkBook can be changed when



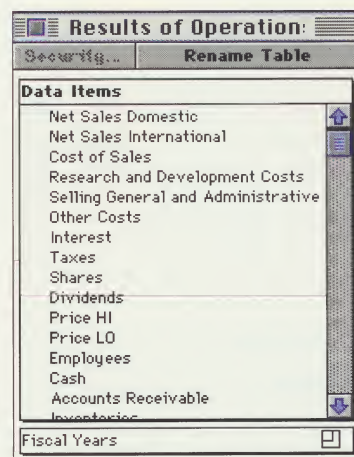
Muse's natural-language interface and full lexicon are part of what sets it apart from conventional data-analysis tools. Dictionaries can be specific to a particular DataBook or available globally.

you want to make speculative modifications in what-if scenarios. Muse clearly marks speculative data to eliminate any confusion that might occur from modified data. Muse does allow you to update the data in a DataBook if you have write permission. DataBooks can be updated only by importing or loading data from files or WorkBooks.

Charts can be created directly from a WorkBook window by selecting data and then clicking on the chart icon in the tool palette. Muse supports a variety of chart types, including 3-D, but the innovative aspect of Muse's charting is that you can animate your charts. This can be an invaluable asset to someone performing data analysis. Using this feature you can watch time-series graphs change dynamically.

Practical applications. Getting up to speed on Muse is not trivial. Although you need not read all of the more than 700 pages of documentation to use it, the tutorial is a useful exercise. There is no procedural language in Muse, which makes delivery of turnkey solutions difficult. Scripts, however, can be created and distributed as "canned" queries, which should facilitate use of the product.

Optimal use of Muse will require a concerted effort from a number of parties in your organization. It is unlikely that managers, who will benefit greatly from the use of the product, will have the background necessary to create third normal databases and publish DataBooks. It is probably equally as unlikely that your database guru would understand the dynamics of your industry well enough to play the appropriate what-if scenarios necessary to glean the full advantages of Muse's data-analysis capabilities.



Opening one of the chapters in a DataBook reveals the different fields in that table. Muse's tables can be comprised of up to eight dimensions. These dimensions are depicted in primary or secondary rows, columns, pages, or chapters in a Muse WorkBook.

Who will use Muse?

Assuming your organization has the capability to support the deployment of Occam Research Corp.'s Muse, what type of users are positioned to reap the benefits this tool has to offer?

Despite the physical appearance of the WorkBook window, Muse is not a spreadsheet, nor is it intended to be used as one. Opportunities for its use range from the analysis of scientific data to studying trends and making forecasts in any business application.

George Potts Sr., Muse's architect, suggests some areas where Muse can help, such as heuristic problem solving or what-if analysis, an expert system for business operations to capture and repeat their successes, or as an ad hoc instrument with which scientists can test their latest hypotheses.

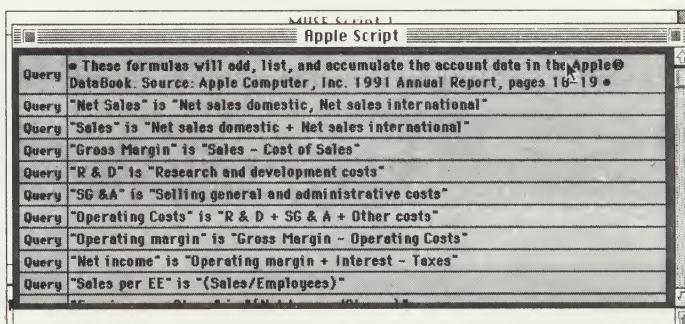
Using the WorkBook and its eight dimensions, elaborate data-boring effects can be achieved that can help those mired in monitoring corporate finances or managing manufacturing resources.

Although Muse cannot be considered a typical platform upon which you might build an executive information system, carefully constructed DataBooks, WorkBooks and Scripts can create an environment that heightens an executive's curiosity and propensity for exploration.

Foremost, Muse is a tool that makes previously daunting tasks approachable from a wider audience. Once an organization has ironed out the process of publishing DataBooks, Muse can help you see the dynamic facets of your data.

— By Jonathan A. Oski

For these reasons, deployment of Muse requires coordination efforts from both a



The screenshot shows a window titled "Apple Script" with a list of queries. The first query is a comment: "These formulas will add, list, and accumulate the account data in the Apple DataBook. Source: Apple Computer, Inc. 1991 Annual Report, pages 16-19". Subsequent queries define formulas for Net Sales, Sales, Gross Margin, R & D, SG & A, Operating Costs, Operating margin, Net income, and Sales per EE.

Query
• These formulas will add, list, and accumulate the account data in the Apple DataBook. Source: Apple Computer, Inc. 1991 Annual Report, pages 16-19 •
"Net Sales" is "Net sales domestic, Net sales international"
"Sales" is "Net sales domestic + Net sales international"
"Gross Margin" is "Sales - Cost of Sales"
"R & D" is "Research and development costs"
"SG & A" is "Selling general and administrative costs"
"Operating Costs" is "R & D + SG & A + Other costs"
"Operating margin" is "Gross Margin - Operating Costs"
"Net income" is "Operating margin + Interest - Taxes"
"Sales per EE" is "(Sales/Employees)"

data-publishing and data-analysis perspective. Without these two disciplines, you are bound to compromise some of what this product has to offer.

Limitations. Muse is surprisingly solid and ambitious for an initial release but did show some signs of immaturity. Muse's dictionary does not support leading zeros. This may present a problem when using data such as product, employee or social-security numbers that frequently contain leading zeros. Another shortcoming in the dictionary is its date handling. Muse does not store dates as real numbers, and thus they cannot be charted. Further, calendar sorts based on month are alphabetical rather than chronological.

There are some known problems importing data from DIF and DBF files into DataBooks, but if the data is read into WorkBooks before being loaded into a DataBook, importation should proceed as expected. Finally, there is a limit of 999 characters in a WorkBook cell, query statement or reply. The WorkBook limitation is something we would consider trivial, but there may be some instances where queries or replies in the Script window may be limited by this constraint.

Conclusions. Muse performed admirably on systems equipped with math coprocessors. While it can be used on systems without an FPU (floating-point unit), users

Muse's Script window provides a natural-language interface between the user and data stored in DataBooks, WorkBooks or Muse's dictionaries and conversion facilities.

should stay away from complex graphics, which can tax your system. Muse's parser is surprisingly robust, especially when considering the elaborate level of commands supported by its natural-language interface. This certainly adds to the usability of the product and does not have the gimmicky feel often found with this feature. Despite the shortcoming of supporting only two columnar and row dimensions in the WorkBook window, at \$695 Muse offers outstanding value. It is packed with features that will keep you pleasantly surprised for some time.

Occam Research Corp. is at 42 Pleasant St., Watertown, Mass. 02172. Phone (617) 923-3545; fax (617) 926-3262. □

SYSTEM 7 COMPATIBILITY

Muse	
Balloon help	Yes
TrueType	n/a
Publish and subscribe	No
Apple events	No
32-bit addressing*	Yes

*According to vendor.